CLAIMS

What is claimed is:

1. An aggregated virtual local area network (VLAN) architecture system comprising:

a metropolitan area network MAN having at least one of a router and a switch;

an edge switch connecting the MAN to a super-VLAN, the super-VLAN comprising at least one of a plurality of sub-VLANs, and wherein the edge switch applies a modified bridge forwarding rule to exchange a VLAN ID associated with the sub-VLAN for a VLAN ID associated with the super-VLAN before forwarding a data packet from the sub-VLAN over the MAN using the at least one of a router and a switch.

2. The aggregated VLAN architecture of claim 1, wherein the edge switch further applies a modified bridge media access control (MAC) address learning rule to prevent the data packet from the sub-VLAN from being forwarded to a different sub-VLAN, the MAC address learning rule comprising a MAC address entry in a forwarding data base (FDB) for each of the plurality of sub-VLANs and the super-VLAN.

3. The aggregated VLAN architecture of claim 2, wherein the MAC address entry is added to the FDB for the sub-VLAN and the super-VLAN when a new MAC address is learned from the sub-VLAN.

4. The aggregated VLAN architecture of claim 3, wherein the MAC address entry is added to the FDB for each of the plurality of sub-VLANs and the super-VLAN when the new MAC address is learned from the super-VLAN.

5. The aggregated VLAN architecture of claim 1, wherein the edge switch applies the modified bridge forwarding rule to exchange a VLAN ID associated with the super-VLAN for a VLAN ID associated with the sub-VLAN before forwarding a data packet from the super-VLAN to a customer associated with the sub-VLAN.

6. The aggregated VLAN architecture of claim 1, wherein the VLAN ID associated with the sub-VLAN is obtained from a header encapsulating the data packet.

7. The aggregated VLAN architecture of claim 6, wherein the header encapsulating the data packet is an 802.1Q frame tag.

8. The aggregated VLAN architecture of claim 5, wherein the VLAN ID associated with the super-VLAN is obtained from the header encapsulating the data packet.

9. The aggregated VLAN architecture of claim 8, wherein the header encapsulating the data packet is an 802.1Q frame tag.

10. The aggregated VLAN architecture of claim 1, wherein the VLAN ID associated with the sub-VLAN is obtained from an internal value stored in the edge switch.

11. The aggregated VLAN architecture of claim 1, wherein the VLAN ID associated with the super-VLAN is obtained from a second internal value stored in the edge switch.

12. A method of aggregating multiple VLANs in a metropolitan area network comprising:

classifying a data packet originating from a sub-VLAN in accordance with an aggregated VLAN configuration, the aggregated VLAN configuration associating the sub-VLAN with a sub-VLAN ID and a super-VLAN ID;

exchanging the sub-VLAN ID for the super-VLAN ID before forwarding the data packet to a MAN;

classifying a data packet originating from a super-VLAN in accordance with the aggregated VLAN configuration, the aggregated VLAN configuration further associating the super-VLAN with a super-VLAN ID and at least one of a plurality of sub-VLAN IDs;

exchanging the super-VLAN ID for the at least one sub-VLAN ID before forwarding the data packet to a customer associated with the at least one sub-VLAN ID.

13. The method of claim 12, wherein the classification comprises obtaining the sub-VLAN ID and the super-VLAN ID from a tag in the data packet, and verifying the obtained VLAN IDs in accordance with the aggregated VLAN configuration values stored in the switch that performs the classification.

14. The method of claim 13, wherein the tag is an 802.1Q frame tag.

15. The method of claim 12, wherein the classification comprises obtaining the sub-VLAN ID and the super-VLAN ID from the aggregated VLAN configuration values stored in the switch that performs the classification.

16. The method of claim 12, further comprising:

preventing the data packet originating from the sub-VLAN from being forwarded to a different sub-VLAN using a modified MAC address learning rule.

17. The method of claim 17, wherein the modified MAC address learning rule comprises a MAC address entry in a table stored in the switch performing the classification, wherein the MAC address entry is added for each of the sub-VLAN and the super-VLAN when the MAC address is learned from the sub-VLAN, and wherein the MAC address entry is added for all of the plurality of sub-VLANs in the aggregated VLAN configuration and the super-VLAN when the MAC address is learned from the super-VLAN.

18. An article of manufacture comprising a machine-accessible medium having stored thereon a plurality of instructions for aggregating multiple VLANs in a metropolitan area network, comprising:

classifying a data packet originating from a sub-VLAN in accordance with an aggregated VLAN configuration, the aggregated VLAN configuration associating the sub-VLAN with a sub-VLAN ID and a super-VLAN ID;

classifying a data packet originating from a super-VLAN in accordance with the aggregated VLAN configuration, the aggregated VLAN configuration further associating the super-VLAN with a super-VLAN ID and at least one of a plurality of sub-VLAN IDs;

exchanging the sub-VLAN ID for the super-VLAN ID before forwarding the data packet to a MAN and exchanging the super-VLAN ID for the at least one sub-VLAN ID before forwarding the data packet to a customer associated with the at least one sub-VLAN ID.

19. A method for controlling processing of data packets in a switch connected to a metropolitan area network (MAN), comprising:

propagating a data packet originating from one of a plurality of sub-VLANs, the plurality of sub-VLANs belonging to a super-VLAN;

exchanging a VLAN ID identifying the originating sub-VLAN with a super-VLAN ID identifying the super-VLAN to which the originating sub-VLAN belongs;

controlling the processing of the data packet to the MAN in accordance with the exchanged super-VLAN ID and a destination Media Access Control (MAC) address specified in the data packet.

20. An edge switch for controlling processing of data packets in a metropolitan area network MAN, comprising:

a port for receiving a data packet on an edge switch originating from one of a plurality of VLANs, the plurality of VLANs associated with a super-VLAN;

a means for assigning a VLAN ID to the data packet that identifies the originating VLAN;

a verifier means for verifying that the assigned VLAN ID matches a value in a memory of the edge switch;

a controller for controlling the processing of the verified data packet to exchange the verified VLAN ID for a super-VLAN ID that identifies the associated super-VLAN; and

a means for propagating the processed data packet to the MAN.

21. The edge switch of claim 20, wherein the means for assigning the VLAN ID includes deriving the identity of the super-VLAN associated with the originating VLAN based on the contents of the data packet's source Internet Protocol (IP) address.

22. The edge switch of claim 20, wherein the means for assigning the VLAN ID includes obtaining the VLAN ID from a header encapsulating the data packet.

23. The edge switch of claim 20, wherein the value in the memory of the edge switch is comprised of an aggregated VLAN configuration.

24. The edge switch of claim 20, further comprising

a port for receiving the data packet from the super-VLAN;

a means for assigning a super-VLAN ID to the data packet that identifies the originating super-VLAN;

a means for verifying that the assigned super-VLAN ID matches a second value in a memory of the edge switch;

the means for controlling the processing of the verified data packet further including a means to exchange the verified super-VLAN ID for a VLAN ID that identifies the destination VLAN; and

the means for propagating the processed data packet further including a means for propagating the data packet to a customer associated with the destination VLAN.